

Herr-Paint Seq. Listing.ST25  
SEQUENCE LISTING

<110> University of Virginia Patent Foundation  
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Wolkowicz, Michael  
Klotz, Kenneth  
Herr, John

<120> Compositions and Methods for Identifying Sperm for Forensic Applications

<130> 00952-03

<150> 60/542,499  
<151> 2004-02-06

<150> 60/581,945  
<151> 2004-06-22

<160> 6

<170> PatentIn version 3.1

<210> 1  
<211> 285  
<212> PRT  
<213> Homo sapiens

<400> 1

Met Asn Arg Phe Leu Leu Leu Met Ser Leu Tyr Leu Leu Gly Ser Ala  
1 5 10 15

Arg Gly Thr Ser Ser Gln Pro Asn Glu Ser Ser Gly Ser Ile Asp His  
20 25 30

Gln Thr Ser Val Gln Gln Leu Pro Gly Glu Phe Phe Ser Leu Glu Asn  
35 40 45

Pro Ser Asp Ala Glu Ala Leu Tyr Glu Thr Ser Ser Gly Leu Asn Thr  
50 55 60

Leu Ser Glu His Gly Ser Ser Glu His Gly Ser Ser Lys His Thr Val  
65 70 75 80

Ala Glu His Thr Ser Gly Glu His Ala Glu Ser Glu His Ala Ser Gly  
85 90 95

Glu Pro Ala Ala Thr Glu His Ala Glu Gly Glu His Thr Val Gly Glu  
100 105 110

Gln Pro Ser Gly Glu Gln Pro Ser Gly Glu His Leu Ser Gly Glu Gln  
115 120 125

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Pro Leu Ser Glu Leu Glu Ser Gly Glu Gln Pro Ser Asp Glu Gln Pro  
 130 135 140

Ser Gly Glu His Gly Ser Gly Glu Gln Pro Ser Gly Glu Gln Ala Ser  
 145 150 155 160

Gly Glu Gln Pro Ser Gly Glu His Ala Ser Gly Glu His Ala Ser Gly  
 165 170 175

Glu Gln Ser Leu Gly Glu His Ala Leu Ser Glu Lys Pro Ser Gly Glu  
 180 185 190

Gln Ala Ser Gly Ala Pro Ile Ser Ser Thr Ser Thr Gly Thr Ile Leu  
 195 200 205

Asn Cys Tyr Thr Cys Ala Tyr Met Asn Asp Gln Gly Lys Cys Leu Arg  
 210 215 220

Gly Glu Gly Thr Cys Ile Thr Gln Asn Ser Gln Gln Cys Met Leu Lys  
 225 230 235 240

Lys Ile Phe Glu Gly Gly Lys Leu Gln Phe Met Val Gln Gly Cys Glu  
 245 250 255

Asn Met Cys Pro Ser Met Asn Leu Phe Ser His Gly Thr Arg Met Gln  
 260 265 270

Ile Ile Cys Cys Arg Asn Gln Ser Phe Cys Asn Lys Ile  
 275 280 285

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<400> 2

Met Ile Ser Ser Lys Pro Arg Leu Val Val Pro Tyr Gly Leu Lys Thr  
 1 5 10 15

Leu Leu Glu Gly Ile Ser Arg Ala Val Leu Lys Thr Asn Pro Ser Asn  
 20 25 30

Ile Asn Gln Phe Ala Ala Ala Tyr Phe Gln Glu Leu Thr Met Tyr Arg  
 35 40 45

Gly Asn Thr Thr Met Asp Ile Lys Asp Leu Val Lys Gln Phe His Gln  
 50 55 60

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Ile Lys Val Glu Lys Trp Ser Glu Gly Thr Thr Pro Gln Lys Lys Leu  
65 70 75 80

Glu Cys Leu Lys Glu Pro Gly Lys Thr Ser Val Glu Ser Lys Val Pro  
85 90 95

Thr Gln Met Glu Lys Ser Thr Asp Thr Asp Glu Asp Asn Val Thr Arg  
100 105 110

Thr Glu Tyr Ser Asp Lys Thr Thr Gln Phe Pro Ser Val Tyr Ala Val  
115 120 125

Pro Gly Thr Glu Gln Thr Glu Ala Val Gly Gly Leu Ser Ser Lys Pro  
130 135 140

Ala Thr Pro Lys Thr Thr Thr Pro Pro Ser Ser Pro Pro Pro Thr Ala  
145 150 155 160

Val Ser Pro Glu Phe Ala Tyr Val Pro Ala Asp Pro Ala Gln Leu Ala  
165 170 175

Ala Gln Met Leu Gly Lys Val Ser Ser Ile His Ser Asp Gln Ser Asp  
180 185 190

Val Leu Met Val Asp Val Ala Thr Ser Met Pro Val Val Ile Lys Glu  
195 200 205

Val Pro Ser Ser Glu Ala Ala Glu Asp Val Met Val Ala Ala Pro Leu  
210 215 220

Val Cys Ser Gly Lys Val Leu Glu Val Gln Val Val Asn Gln Thr Ser  
225 230 235 240

Val His Val Asp Leu Gly Ser Gln Pro Lys Glu Asn Glu Ala Glu Pro  
245 250 255

Ser Thr Ala Ser Ser Val Pro Leu Gln Asp Glu Gln Glu Pro Pro Ala  
260 265 270

Tyr Asp Gln Ala Pro Glu Val Thr Leu Gln Ala Asp Ile Glu Val Met  
275 280 285

Ser Thr Val His Ile Ser Ser Val Tyr Asn Asp Val Pro Val Thr Glu  
290 295 300

Gly Val Val Tyr Ile Glu Gln Leu Pro Glu Gln Ile Val Ile Pro Phe  
305 310 315 320

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Thr Asp Gln Val Ala Cys Leu Lys Glu Asn Glu Gln Ser Lys Glu Asn  
 325 330 335  
 Glu Gln Ser Pro Arg Val Ser Pro Lys Ser Val Val Glu Lys Thr Thr  
 340 345 350  
 Ser Gly Met Ser Lys Lys Ser Val Glu Ser Val Lys Leu Ala Gln Leu  
 355 360 365  
 Glu Glu Asn Ala Lys Tyr Ser Ser Val Tyr Met Glu Ala Glu Ala Thr  
 370 375 380  
 Ala Leu Leu Ser Asp Thr Ser Leu Lys Gly Gln Pro Glu Val Pro Ala  
 385 390 395 400  
 Gln Leu Leu Asp Ala Glu Gly Ala Ile Lys Ile Gly Ser Glu Lys Ser  
 405 410 415  
 Leu His Leu Glu Val Glu Val Thr Ser Ile Val Ser Asp Asn Thr Gly  
 420 425 430  
 Gln Glu Glu Ser Gly Glu Asn Ser Val Pro Gln Glu Met Glu Gly Arg  
 435 440 445  
 Pro Val Leu Ser Gly Glu Ala Ala Glu Ala Val His Ser Gly Thr Ser  
 450 455 460  
 Val Lys Ser Ser Ser Gly Pro Phe Pro Pro Ala Pro Glu Gly Leu Thr  
 465 470 475 480  
 Ala Pro Glu Ile Glu Pro Glu Gly Glu Ser Thr Ala Glu Gly Leu Met  
 485 490 495  
 Lys Pro Ala Met Ala Thr Ser Glu Arg Gly Gln Pro Pro Pro Cys Ser  
 500 505 510  
 Asn Met Trp Thr Leu Tyr Cys Leu Thr Asp Lys Asn Gln Gln Gly His  
 515 520 525  
 Pro Ser Pro Pro Pro Ala Pro Gly Pro Phe Pro Gln Ala Thr Leu Tyr  
 530 535 540  
 Leu Pro Asn Pro Lys Asp Pro Gln Phe Gln Gln His Pro Pro Lys Val  
 545 550 555 560  
 Thr Phe Pro Thr Tyr Val Met Gly Asp Thr Lys Lys Thr Ser Ala Pro  
 565 570 575

## Herr-Paint Seq. Listing.ST25

Pro Phe Ile Leu Val Gly Ser Asn Val Gln Glu Ala Gln Gly Trp Lys  
                   580                                  585                                  590

Pro Leu Pro Gly His Ala Val Val Ser Gln Ser Asp Val Leu Arg Tyr  
                   595                                  600                                  605

Val Ala Met Gln Val Pro Ile Ala Val Pro Ala Asp Glu Lys Tyr Gln  
                   610                                  615                                  620

Lys His Thr Leu Ser Pro Gln Asn Ala Asn Pro Pro Ser Gly Gln Asp  
   625                                  630                                  635                                  640

Val Pro Arg Pro Lys Ser Pro Val Phe Leu Ser Val Ala Phe Pro Val  
                   645                                  650                                  655

Glu Asp Val Ala Lys Lys Ser Ser Asp Ser Gly Asp Lys Cys Ala Pro  
                   660                                  665                                  670

Phe Gly Ser Tyr Gly Ile Ala Gly Glu Val Thr Val Thr Thr Ala His  
                   675                                  680                                  685

Lys Arg Arg Lys Ala Glu Thr Glu Asn  
   690                                  695

<210> 3  
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 <213> Homo sapiens  
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Met Lys Pro Leu Val Leu Leu Val Ala Leu Leu Leu Trp Pro Ser Ser  
   1                                  5                                  10                                  15

Val Pro Ala Tyr Pro Ser Ile Thr Val Thr Pro Asp Glu Glu Gln Asn  
                   20                                  25                                  30

Leu Asn His Tyr Ile Gln Val Leu Glu Asn Leu Val Arg Ser Val Pro  
                   35                                  40                                  45

Ser Gly Glu Pro Gly Arg Glu Lys Lys Ser Asn Ser Pro Lys His Val  
   50                                  55                                  60

Tyr Ser Ile Ala Ser Lys Gly Ser Lys Phe Lys Glu Leu Val Thr His  
   65                                  70                                  75                                  80

Gly Asp Ala Ser Thr Glu Asn Asp Val Leu Thr Asn Pro Ile Ser Glu  
                   85                                  90                                  95

## Herr-Paint Seq. Listing.ST25

Glu Thr Thr Thr Phe Pro Thr Gly Gly Phe Thr Pro Glu Ile Gly Lys  
 100 105 110  
 Lys Lys His Thr Glu Ser Thr Pro Phe Trp Ser Ile Lys Pro Asn Asn  
 115 120 125  
 Val Ser Ile Val Leu His Ala Glu Glu Pro Tyr Ile Glu Asn Glu Glu  
 130 135 140  
 Pro Glu Pro Glu Pro Glu Pro Ala Ala Lys Gln Thr Glu Ala Pro Arg  
 145 150 155 160  
 Met Leu Pro Val Val Thr Glu Ser Ser Thr Ser Pro Tyr Val Thr Ser  
 165 170 175  
 Tyr Lys Ser Pro Val Thr Thr Leu Asp Lys Ser Thr Gly Ile Glu Ile  
 180 185 190  
 Tyr Thr Glu Ser Glu Asp Val Pro Gln Leu Ser Gly Glu Thr Ala Ile  
 195 200 205  
 Glu Lys Pro Glu Glu Phe Gly Lys His Pro Glu Ser Trp Asn Asn Asp  
 210 215 220  
 Asp Ile Leu Lys Lys Ile Leu Asp Ile Asn Ser Gln Val Gln Gln Ala  
 225 230 235 240  
 Leu Leu Ser Asp Thr Ser Asn Pro Ala Tyr Arg Glu Asp Ile Glu Ala  
 245 250 255  
 Ser Lys Asp His Leu Lys Pro Ser Leu Ala Leu Ala Ala Ala Ala Glu  
 260 265 270  
 His Lys Leu Lys Thr Met Tyr Lys Ser Gln Leu Leu Pro Val Gly Arg  
 275 280 285  
 Thr Ser Asn Lys Ile Asp Asp Ile Val Thr Val Ile Asn Met Leu Cys  
 290 295 300  
 Asn Ser Arg Ser Lys Leu Tyr Glu Tyr Leu Asp Ile Lys Cys Val Pro  
 305 310 315 320  
 Pro Glu Met Arg Glu Lys Ala Ala Thr Val Phe Asn Thr Leu Lys Asn  
 325 330 335  
 Met Cys Arg Ser Arg Arg Val Thr Ala Leu Leu Lys Val Tyr

340

Herr-Paint Seq. Listing.ST25  
345 350

<210> 4  
 <211> 294  
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 <213> Homo sapiens

&lt;400&gt; 4

Met Ser Pro Arg Gly Thr Gly Cys Ser Ala Gly Leu Leu Met Thr Val  
 1 5 10 15

Gly Trp Leu Leu Leu Ala Gly Leu Gln Ser Ala Arg Gly Thr Asn Val  
 20 25 30

Thr Ala Ala Val Gln Asp Ala Gly Leu Ala His Glu Gly Glu Gly Glu  
 35 40 45

Glu Glu Thr Glu Asn Asn Asp Ser Glu Thr Ala Glu Asn Tyr Ala Pro  
 50 55 60

Pro Glu Thr Glu Asp Val Ser Asn Arg Asn Val Val Lys Glu Val Glu  
 65 70 75 80

Phe Gly Met Cys Thr Val Thr Cys Gly Ile Gly Val Arg Glu Val Ile  
 85 90 95

Leu Thr Asn Gly Cys Pro Gly Gly Glu Ser Lys Cys Val Val Arg Val  
 100 105 110

Glu Glu Cys Arg Gly Pro Thr Asp Cys Gly Trp Gly Lys Pro Ile Ser  
 115 120 125

Glu Ser Leu Glu Ser Val Arg Leu Ala Cys Ile His Thr Ser Pro Leu  
 130 135 140

Asn Arg Phe Lys Tyr Met Trp Lys Leu Leu Arg Gln Asp Gln Gln Ser  
 145 150 155 160

Ile Ile Leu Val Asn Asp Ser Ala Ile Leu Glu Val Arg Lys Glu Ser  
 165 170 175

His Pro Leu Ala Phe Glu Cys Asp Thr Leu Asp Asn Asn Glu Ile Val  
 180 185 190

Ala Thr Ile Lys Phe Thr Val Tyr Thr Ser Ser Glu Leu Gln Met Arg  
 195 200 205

Arg Ser Ser Leu Pro Ala Thr Asp Ala Ala Leu Ile Phe Val Leu Thr  
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<211>	97
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<213>	Homo sapiens
<400>	5

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<213> Homo sapiens
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## Herr-Paint Seq. Listing.ST25

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Met Ser Glu Lys Val Asp Trp Leu Gln Ser Gln Asn Gly Val Cys Lys  
 1 5 10 15

Val Asp Val Tyr Ser Pro Gly Asp Asn Gln Ala Gln Asp Trp Lys Met  
 20 25 30

Asp Thr Ser Thr Asp Pro Val Arg Val Leu Ser Trp Leu Arg Arg Asp  
 35 40 45

Leu Glu Lys Ser Thr Ala Glu Phe Gln Asp Val Arg Phe Lys Pro Gly  
 50 55 60

Glu Ser Phe Gly Gly Glu Thr Ser Asn Ser Gly Asp Pro His Lys Gly  
 65 70 75 80

Phe Ser Val Asp Tyr Tyr Asn Thr Thr Thr Lys Gly Thr Pro Glu Arg  
 85 90 95

Leu His Phe Glu Met Thr His Lys Glu Ile Pro Cys Gln Gly Pro Arg  
 100 105 110

Ala Gln Leu Gly Asn Gly Ser Ser Val Asp Glu Val Ser Phe Tyr Ala  
 115 120 125

Asn Arg Leu Thr Asn Leu Val Ile Ala Met Ala Arg Lys Glu Ile Asn  
 130 135 140

Glu Lys Ile Asp Gly Ser Glu Asn Lys Cys Val Tyr Gln Ser Leu Tyr  
 145 150 155 160

Met Gly Asn Glu Pro Thr Pro Thr Lys Ser Leu Ser Lys Ile Ala Ser  
 165 170 175

Glu Leu Val Asn Glu Thr Val Ser Ala Cys Ser Arg Asn Ala Ala Pro  
 180 185 190

Asp Lys Ala Pro Gly Ser Gly Asp Arg Val Ser Gly Ser Ser Gln Ser  
 195 200 205

Pro Pro Asn Leu Lys Tyr Lys Ser Thr Leu Lys Ile Lys Glu Ser Thr  
 210 215 220

Lys Glu Arg Gln Gly Pro Asp Asp Lys Pro Pro Ser Lys Lys Ser Phe  
 225 230 235 240

Phe Tyr Lys Glu Val Phe Glu Ser Arg Asn Gly Asp Tyr Ala Arg Glu  
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Gly	Gly	Arg	Phe 260	Phe	Pro	Arg	Glu	Arg 265	Lys	Arg	Phe	Arg	Gly 270	Gln	Glu
Arg	Pro	Asp 275	Asp	Phe	Thr	Ala	Ser 280	Val	Gly	Glu	Gly	Ile 285	Met	Thr	Tyr
Ala	Asn 290	Ser	Val	Val	Ser	Asp 295	Met	Met	Val	Ser	Ile 300	Met	Lys	Thr	Leu
Lys 305	Ile	Gln	Val	Lys	Asp 310	Thr	Thr	Ile	Ala	Thr 315	Ile	Leu	Leu	Lys	Lys 320
Val	Leu	Leu	Lys	His 325	Ala	Lys	Glu	Val	Val 330	Ser	Asp	Leu	Ile	Asp 335	Ser
Phe	Leu	Arg	Asn 340	Leu	His	Ser	Val	Thr 345	Gly	Thr	Leu	Met	Thr 350	Asp	Thr
Gln	Phe	Val 355	Ser	Ala	Val	Lys	Arg 360	Thr	Val	Phe	Ser	His 365	Gly	Ser	Gln
Lys	Ala 370	Thr	Asp	Ile	Met	Asp 375	Ala	Met	Leu	Arg	Lys 380	Leu	Tyr	Asn	Val
Met 385	Phe	Ala	Lys	Lys	Val 390	Pro	Glu	His	Val	Arg 395	Lys	Ala	Gln	Asp	Lys 400
Ala	Val	Ser	Tyr	Ser 405	Leu	Ile	Ser	Met	Lys 410	Gly	Met	Gly	Asp	Pro 415	Lys
Asn	Arg	Asn	Val 420	Asn	Phe	Ala	Met	Lys 425	Ser	Glu	Thr	Lys	Leu 430	Arg	Glu
Lys	Met	Tyr 435	Ser	Glu	Pro	Lys	Ser 440	Glu	Glu	Glu	Thr	Cys 445	Ala	Lys	Thr
Leu	Gly 450	Glu	His	Ile	Ile	Lys 455	Glu	Gly	Leu	Thr	Leu 460	Trp	His	Lys	Ser
Gln 465	Gln	Asn	Glu	Cys	Lys 470	Ser	Leu	Gly	Phe	Gln 475	His	Ala	Ala	Phe	Glu 480
Ala	Pro	Asn	Thr	Gln 485	Arg	Lys	Pro	Ala	Ser 490	Asp	Ile	Ser	Phe	Glu 495	Tyr

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Pro Glu Asp Thr Gly Asn Leu Ser Leu Pro Pro Tyr Pro Pro Glu Lys  
500 505 510

Pro Glu Asn Phe Met Tyr Asp Ser Asp Ser Trp Ala Lys Asp Leu Ile  
515 520 525

Val Ser Ala Leu Leu Leu Ile Gln Tyr His Leu Ala Gln Gly Gly Arg  
530 535 540

Arg Asp Ala Arg Ser Phe Val Glu Ala Ala Gly Thr Thr Asn Phe Pro  
545 550 555 560

Ala Asn Glu Pro Pro Val Ala Pro Asp Glu Ser Cys Leu Lys Ser Ala  
565 570 575

Pro Ile Val Gly Asp Gln Glu Gln Ala Glu Lys Lys Asp Leu Arg Ser  
580 585 590

Val Phe Phe Asn Ser Ile Arg Asn Leu Leu Ser Glu Thr Ile Phe Lys  
595 600 605

Arg Asp Gln Ser Pro Glu Pro Lys Val Pro Glu Gln Pro Val Lys Glu  
610 615 620

Asp Arg Lys Leu Cys Glu Arg Pro Leu Ala Ser Ser Pro Pro Arg Leu  
625 630 635 640

Tyr Glu Asp Asp Glu Thr Pro Gly Ala Leu Ser Gly Leu Thr Lys Met  
645 650 655

Ala Val Ser Gln Ile Asp Gly His Met Ser Gly Gln Met Val Glu His  
660 665 670

Leu Met Asn Ser Val Met Lys Leu Cys Val Ile Ile Ala Lys Ser Cys  
675 680 685

Asp Ala Ser Leu Ala Glu Leu Gly Asp Asp Lys Leu Gly Asp Ala Ser  
690 695 700

Arg Leu Thr Ser Ala Phe Pro Asp Ser Leu Tyr Glu Cys Leu Pro Ala  
705 710 715 720

Lys Gly Thr Gly Ser Ala Glu Ala Val Leu Gln Asn Ala Tyr Gln Ala  
725 730 735

Ile His Asn Glu Met Arg Gly Thr Ser Gly Gln Pro Pro Glu Gly Cys  
740 745 750

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Ala Ala Pro Thr Val Ile Val Ser Asn His Asn Leu Thr Asp Thr Val  
           755                          760                          765

Gln Asn Lys Gln Leu Gln Ala Val Leu Gln Trp Val Ala Ala Ser Glu  
       770                          775                          780

Leu Asn Val Pro Ile Leu Tyr Phe Ala Gly Asp Asp Glu Gly Ile Gln  
   785                          790                          795                          800

Glu Lys Leu Leu Gln Leu Ser Ala Ala Ala Val Asp Lys Gly Cys Ser  
                           805                          810                          815

Val Gly Glu Val Leu Gln Ser Val Leu Arg Tyr Glu Lys Glu Arg Gln  
                           820                          825                          830

Leu Asn Glu Ala Val Gly Asn Val Thr Pro Leu Gln Leu Leu Asp Trp  
           835                          840                          845

Leu Met Val Asn Leu  
       850